

Title (en)  
WATERBORNE COATING COMPOSITION

Title (de)  
WÄSSRIGE BESCHICHTUNGSZUSAMMENSETZUNG

Title (fr)  
COMPOSITIONS DE REVÊTEMENT À BASE D'EAU

Publication  
**EP 3892682 A1 20211013 (EN)**

Application  
**EP 20169053 A 20200409**

Priority  
EP 20169053 A 20200409

Abstract (en)

The present invention generally relates to the field of cross-linkable aqueous vinyl polymer dispersions, to a coating composition comprising said cross-linkable aqueous vinyl polymer dispersions; to a paint formulation comprising said cross-linkable aqueous vinyl polymer dispersions; and to an article coated with the coating composition or the paint formulation. In particular, the present invention provides an aqueous vinyl polymer dispersion PD which comprises the following polymers:- 1) an aqueous dispersion of a vinyl polymer P1 obtainable by free radical emulsion polymerization of a monomers mixture comprising:a) 5 to 20 wt% acid functional ethylenically unsaturated monomers M1 or precursors thereof;b) 5 to 25 wt% ethylenically unsaturated monomers M2 containing a polyethylene glycol or monoalkoxy polyethylene glycol moiety;c) up to 90 wt% of non-ionic ethylenically unsaturated monomers M3 other than M1 or M2;d) 0 to 10 wt% ethylenically unsaturated monomers M4 with a functional group for cross-linking after film-formation;e) 0 to 10 wt% of at least one chain transfer agent CTA;where the sum of the wt.% of M1+M2+M3+M4+CTA = 100 wt%;- 2) an aqueous dispersion or solution of a vinyl polymer P2 obtainable by free radical copolymerization of:a) from 25 to 95 wt% of a ethylenically unsaturated monomers M5 selected from the group of N-vinyl amides with general structure:where  $R_{<sub>1</sub>}$  and  $R_{<sub>2</sub>}$  are alkyl from  $C_{<sub>1</sub>}$  to  $C_{<sub>5</sub>}$  and may be connected to form a ring-structure, preferably N-vinyl pyrrolidone or N-vinyl caprolactam;b) from 5 to 75 wt% of non-ionic ethylenically unsaturated monomers M3' other than M5c) from 0 to 5 wt% of ethylenically unsaturated monomers M4' with a functional group for cross-linking after film-formationd) from 0 to 10 wt% acid functional ethylenically unsaturated monomers M1' or precursors thereof;e) from 0 to 5 wt% of at least one chain transfer agent CTA';where the sum of the wt.% of: M5+M3'+M4'+M1'+CTA' = 100 wt%;- 3) a film-forming vinyl polymer P3 under the form of an aqueous dispersion comprising:i) from 20 to 60 wt% of a water-soluble or water dispersible crosslinkable vinyl oligomer OL obtained by emulsion polymerizing a monomer mixture comprising :1) at least one acid functional ethylenically unsaturated monomer M1";2) at least one ethylenically unsaturated monomer M4" with functionality for crosslinking upon film-formation, other than M1";3) at least one ethylenically unsaturated monomer M3" other than M1" and M2", and5) optionally, at least one chain transfer agent CTA", andii) from 40 to 80 wt% of a high molecular weight vinyl polymer P4 prepared by emulsion polymerizing, in the presence of the water-soluble or water-dispersible crosslinkable vinyl oligomer OL, a monomer mixture comprising:1) optionally one acid functional ethylenically unsaturated monomer M1";2) optionally one or more ethylenically unsaturated monomers M4" with functionality for crosslinking upon film-formation, other than M1";3) at least one ethylenically unsaturated monomer M3" other than M1" and M2" and4) optionally, one or more multifunctional ethylenically unsaturated monomers for pre-crosslinking, M5", preferably in an amount less than 5 wt%.- Where the total weight of film-forming vinyl polymer P3 = wt.% of the water-soluble or water dispersible crosslinkable vinyl oligomer OL + wt.% of the high molecular weight vinyl polymer P4= i) + ii) = 100 wt% and- Where the total weight of the vinyl polymer in the aqueous vinyl polymer dispersion PD = wt.% of the vinyl polymer P1 + wt.% of the vinyl polymer P2 + wt.% of the film-forming vinyl polymer P3 = 100 wt%.

IPC 8 full level

**C08L 33/10** (2006.01); **C08L 39/06** (2006.01); **C08L 51/00** (2006.01); **C09D 5/02** (2006.01); **C09D 7/65** (2018.01); **C09D 151/00** (2006.01)

CPC (source: EP KR US)

**C08F 2/26** (2013.01 - EP KR US); **C08F 2/38** (2013.01 - EP); **C08F 220/14** (2013.01 - KR US); **C08F 220/285** (2020.02 - KR); **C08F 226/10** (2013.01 - KR); **C08F 265/06** (2013.01 - EP); **C08F 290/06** (2013.01 - KR); **C08L 33/12** (2013.01 - US); **C08L 39/06** (2013.01 - US); **C09D 5/022** (2013.01 - EP KR); **C09D 7/65** (2018.01 - EP KR); **C09D 7/80** (2018.01 - US); **C09D 133/12** (2013.01 - US); **C09D 133/14** (2013.01 - EP KR); **C09D 151/003** (2013.01 - EP KR); **C08F 220/14** (2013.01 - EP); **C08F 220/1804** (2020.02 - EP); **C08F 226/10** (2013.01 - EP); **C08F 2800/20** (2013.01 - US); **C08L 2201/54** (2013.01 - EP US); **C08L 2205/03** (2013.01 - US)

C-Set (source: EP)

1. **C08F 226/10 + C08F 220/1802**
2. **C08F 220/14 + C08F 220/1804 + C08F 220/58 + C08F 220/06 + C08F 216/1475**
3. **C08F 265/06 + C08F 220/1804 + C08F 220/14 + C08F 212/08 + C08F 212/36**
4. **C09D 151/003 + C08L 33/10 + C08L 39/06**
5. **C08F 220/1804 + C08F 220/14 + C08F 220/285 + C08F 220/06 + C08F 216/1475**
6. **C08F 220/1804 + C08F 220/14 + C08F 220/06 + C08F 220/285 + C08F 216/1475**

Citation (applicant)

- EP 0136025 B1 19911113
- EP 0593151 B1 19970319 - ROHM & HAAS [US]
- US 2001031826 A1 20011018 - LAUBENDER MATTHIAS [DE], et al
- WO 2012130817 A1 20121004 - NUPLEX RESINS BV [NL], et al
- WO 2015107163 A1 20150723 - NUPLEX RESINS BV [NL]
- US 2007043156 A1 20070222 - MESTACH DIRK EMIEL P [BE], et al
- US 6872789 B2 20050329 - BRINKHUIS RICHARD HENDRIKUS GE [NL], et al
- "Chemistry and Technology of Emulsion Polymerisation", 2005, BLACKWELL PUBLISHING LTD
- T. G. FOX, BULL. AM. PHYS. SOC., vol. 1, 1956, pages 123
- "Glass transition values for homopolymers given in the Polymer Handbook", 1999, JOHN WILEY & SONS, INC.

Citation (search report)

- [AD] WO 2012130817 A1 20121004 - NUPLEX RESINS BV [NL], et al
- [AD] WO 2015107163 A1 20150723 - NUPLEX RESINS BV [NL]
- [A] US 2020024460 A1 20200123 - HEARLEY ANDREW [NL]
- [A] US 2014039122 A1 20140206 - MESTACH DIRK EMIEL PAULA [BE], et al

Designated contracting state (EPC)

AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR

Designated extension state (EPC)

BA ME

DOCDB simple family (publication)

**EP 3892682 A1 20211013**; AU 2021252096 A1 20221013; CN 115485333 A 20221216; EP 4133010 A1 20230215; EP 4133010 B1 20240605;  
JP 2023520805 A 20230519; KR 20220166820 A 20221219; US 2023142644 A1 20230511; WO 2021204723 A1 20211014

DOCDB simple family (application)

**EP 20169053 A 20200409**; AU 2021252096 A 20210402; CN 202180027188 A 20210402; EP 2021058797 W 20210402;  
EP 21716419 A 20210402; JP 2022561992 A 20210402; KR 20227038133 A 20210402; US 202117916264 A 20210402